



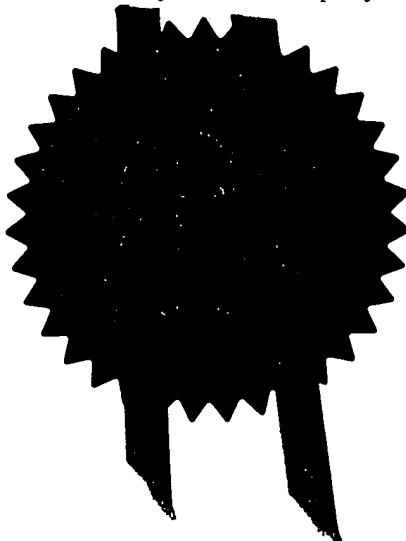
The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

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Signed

Dated 13 FEB 2001

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form).

1. Your Reference

P.6183

2. Patent application number

(The Patent Office will fill in this part)

9905038.7

3. Full name, address and postcode of the or of each applicant (*underline all surnames*)

05 MAR 1999

NEW TRANSDUCERS LIMITED
Stonehill
Huntingdon
Cambridgeshire
PE18 6ED, G.B.

Patents ADP number (*if you know it*)

7133119003

If the applicant is a corporate body, give the country/state of its incorporation

G.B.

4. Title of the invention

LOUDSPEAKERS

5. Name of your agent (*if you have one*)

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)

MAGUIRE BOSS
5 Crown Street
St. Ives
Cambridgeshire
PE17 4EB

Patents ADP number (*if you know it*)

00009191002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

| Country | Priority application number (<i>if you know it</i>) | Date of filing (<i>day/month/year</i>) |
|---------|--|---|
|---------|--|---|

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

| Number of earlier application | Date of filing (<i>day/month/year</i>) |
|-------------------------------|---|
|-------------------------------|---|

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.)

See note (d)

Yes

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.
Do not count copies of the same document

Continuation sheets of this form

| | | |
|-------------|---|-----------|
| Description | 5 | <i>OP</i> |
| Claims(s) | | |
| Abstract | | |

| | | |
|------------|-------|-----------|
| Drawing(s) | 4 + 4 | <i>OP</i> |
| | | |

10. If you are also filing any of the following,
state how many against each item.

Priority documents

Translations of priority documents

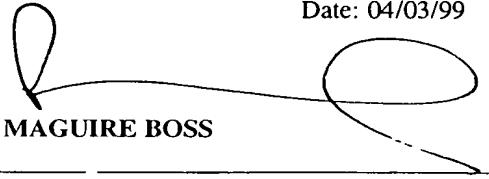
Statement of inventorship and right
to grant of a patent (*Patents Form 7/77*)Request for preliminary examination
and search (*Patents Form 9/77*)Request for substantive examination
(*Patents Form 10/77*)Any other documents
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date: 04/03/99

MAGUIRE BOSS


12. Name and daytime telephone number of
person to contact in the United Kingdom

P.A. MAGUIRE

Tel: 01480 301588

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5

TITLE: LOUDSPEAKERS

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DESCRIPTION

15 The invention relates to loudspeakers and more particularly to resonant panel loudspeakers, e.g. of the kind described in WO97/09842. Such loudspeakers are known as resonant mode or distributed mode loudspeakers (DML).

It is an object of the invention to enhance the
20 functionality of a resonant panel loudspeaker to enable direct user input.

According to the invention, a loudspeaker comprises a resonant panel member having a user-accessible surface and means on or associated with the surface and responsive to
25 user contact. The user responsive means may act as a touch control means, e.g. whereby the user can enter instructions or provide information, e.g. to apparatus associated with the loudspeaker.

Thus for example the loudspeaker may form a control panel, e.g. for a vending machine of the kind described in WO97/09842.

Alternatively where the resonant panel of the 5 loudspeaker is transparent, the loudspeaker may form part of a visual display apparatus, e.g. for a computer and the touch control means may control operation of the computer.

The idea is thus applicable to any resonant mode speaker panel where a person is able to touch the surface, 10 and may comprise pads or areas or switches or buttons which provide a means for instructions or information to be entered.

In the case of a resonant glass or plastics transparent speaker the means may comprise visible or 15 invisible areas, delineated by printing or labelling as required or if visible by a contact or metallisation, which may use capacitative or conductive or alternative methods of sensing the immediate presence or contact by a person, finger etc.

20 Pressure switches may also be attached to the surface or embedded within. For both transparent and transluscent and opaque speaker types these and other well-known methods may be used.

The resonant speaker panel may also be combined with 25 other methods for sensing which include matrices of photodiodes and/or photocells round the perimeter of the panel and which sense the position, e.g. of a finger directed at a point on the panel.

Where metallised contacts are used these may be of the metal oxide film or thin metal film type and may thereby be rendered transparent if required, including the related wiring. Thus both the contact areas and the connective 5 wiring to the edge of the panel may be designed so as not to impair the optical properties of the panel.

Applications include touch screen control for transparent computer and video display resonant panel loudspeakers, for translucent display and lighting resonant 10 panel speakers, and for automated ticket machine (ATM) and vending machine applications. Many other categories are indicated for example in consumer electronics such as a speaking or sound informing resonant touch panel for a remote control unit, whether illuminated or not, a similar 15 concept applied to a mobile telephone display of suitable area even combining a display, a loudspeaker and a control panel with illumination. With the development of mobile video telephones the concept offers further engineering value with the transparent touch type speaker panel also 20 forming part of the video display assembly or associated design.

User feedback of control settings via the resonant speaker panel with incorporated switch buttons would find utility in the control sections of hi-fi and audio 25 equipment, particularly where complex setting up is required for example in home theatre systems.

Also domestic appliances, e.g. dishwashers, washing machines would benefit from the addition of this

technology, as would industrial instrumentation, display orientated instructions such as analysers and oscilloscopes.

The invention could be applied to laptop and other computer controls, points of sales data systems, personal, stock control and labelling devices, and also to automotive navigation units, dashboard displays with a 'window' comprising a resonant panel speaker design, point of sale products with sound output and facility for user/customer data entry or control of operational information, and similarly for educational display units for museums, zoos etc, interactive audio visual devices.

The invention thus provides a resonant panel loudspeaker of increased functionality.

The invention is diagrammatically illustrated, by way of example, in the accompanying drawings in which:-

Figure 1 shows the resonant panel loudspeaker/touch pad applied to a vending machine;

Figure 2 shows the resonant loudspeaker/touch pad applied to opposite side edges of a television or the like VDU;

Figure 3 shows a laptop computer having a display screen combined with a resonant panel loudspeaker and with a touch pad;

Figure 4 shows a mobile 'phone having a display screen combined with a resonant panel loudspeaker and with a touchpad;

Figure 5 is a scrap cross-sectional side view of a

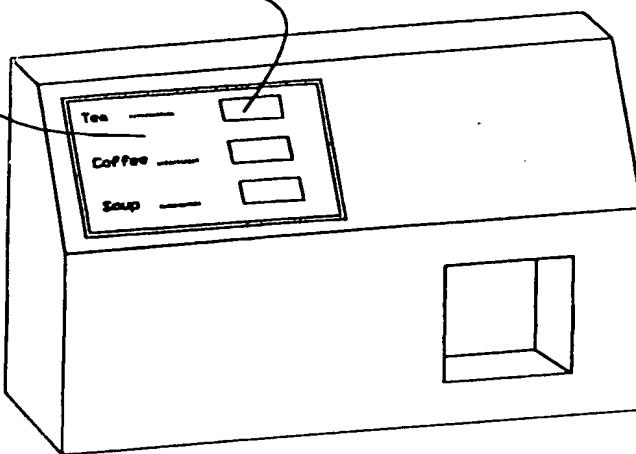
combined resonant panel loudspeaker and touchpad;

Figures 6a and 6b are respective cross-sectional side views of modules combining the functions of display screens, resonant panel loudspeaker and touchpad and 5 showing at a a variant in which the resonant panel is excited by an electrodynamic exciter and at b a variant in which the resonant panel is excited by a piezo exciter, and

Figure 7 is a perspective view of the module shown in Figure 6a.

Fig 1

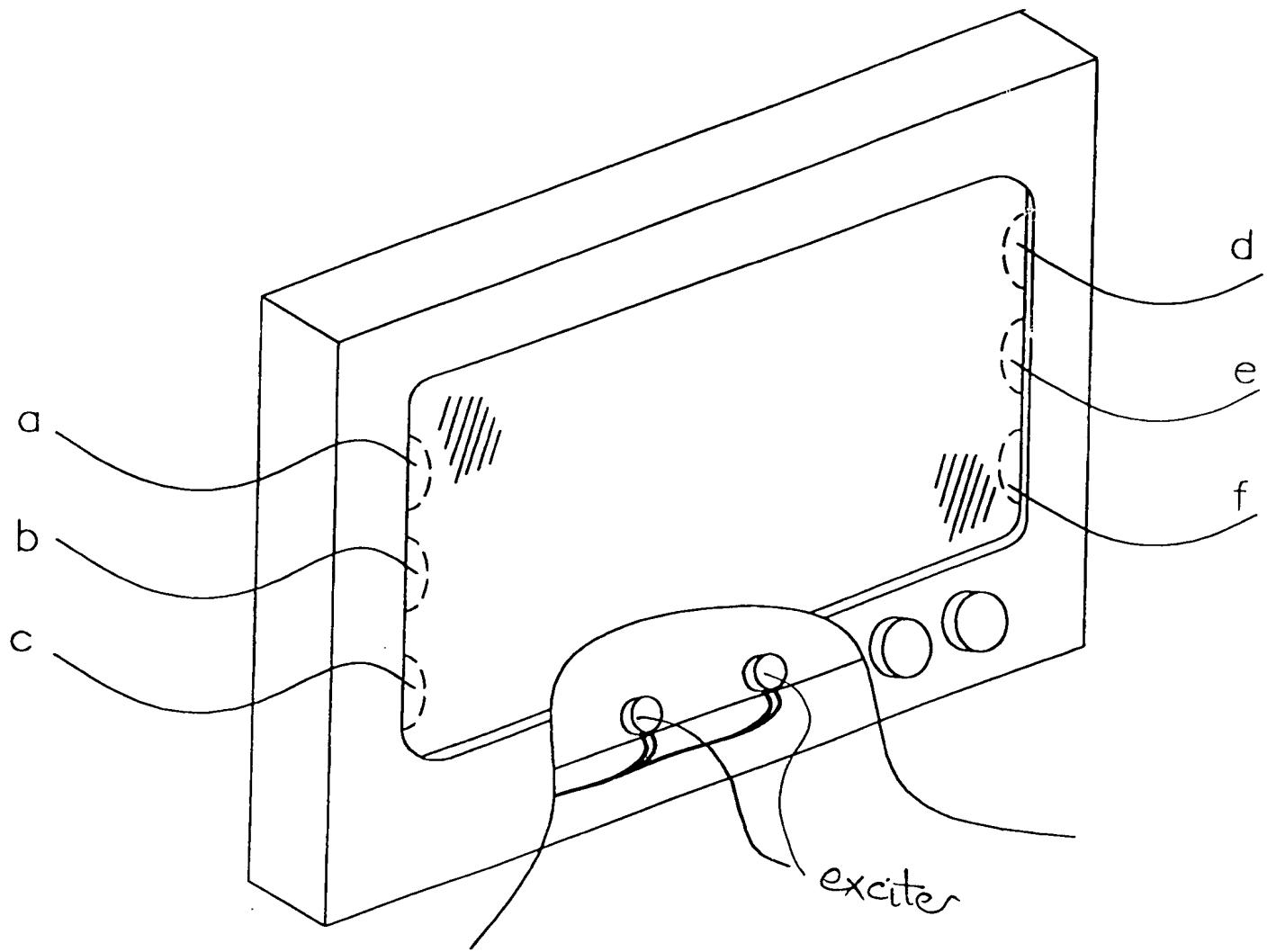
Back lit touch pads.
Speaker module.



Vending machine.

Figure 2

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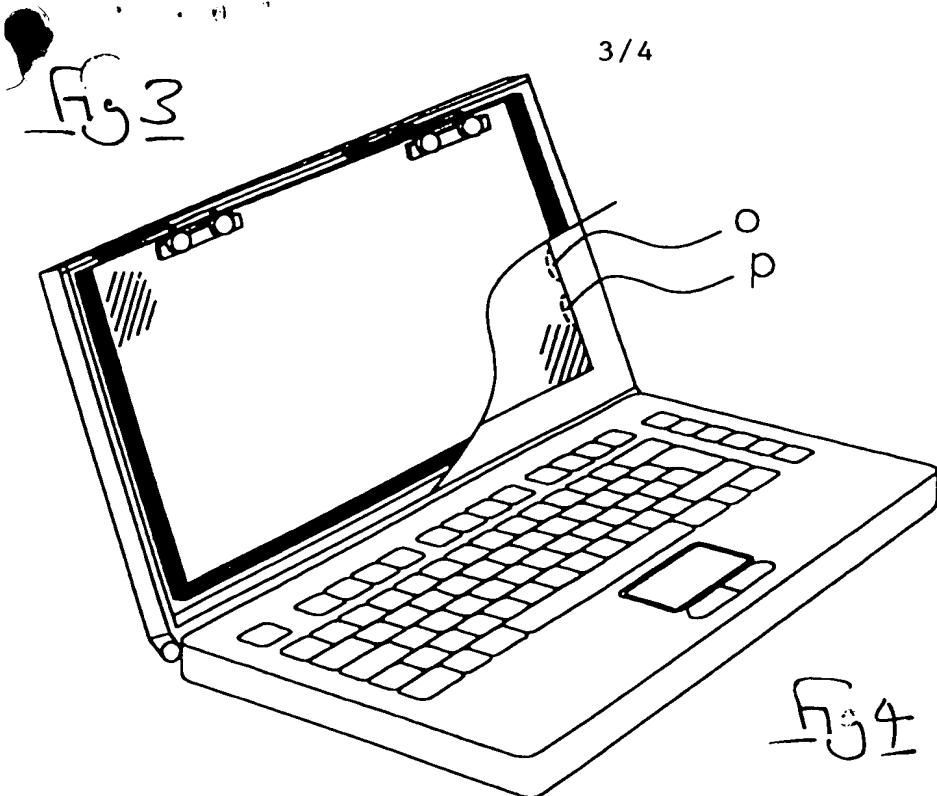


Fig 4

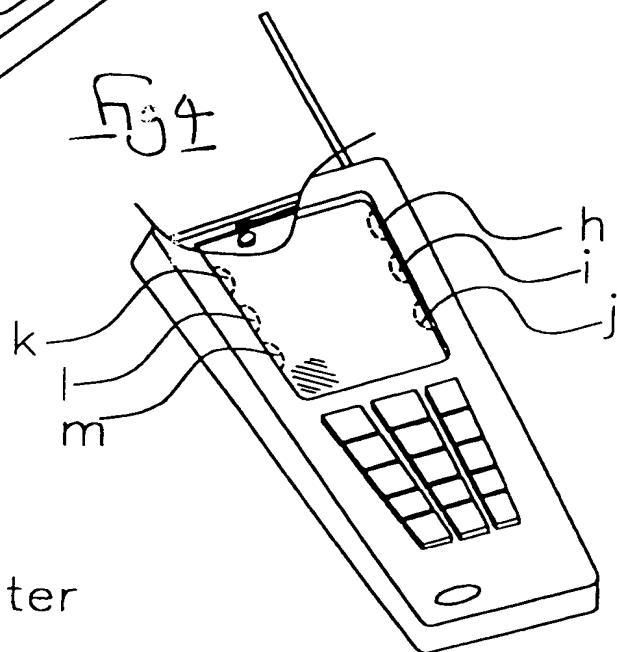


Fig 5

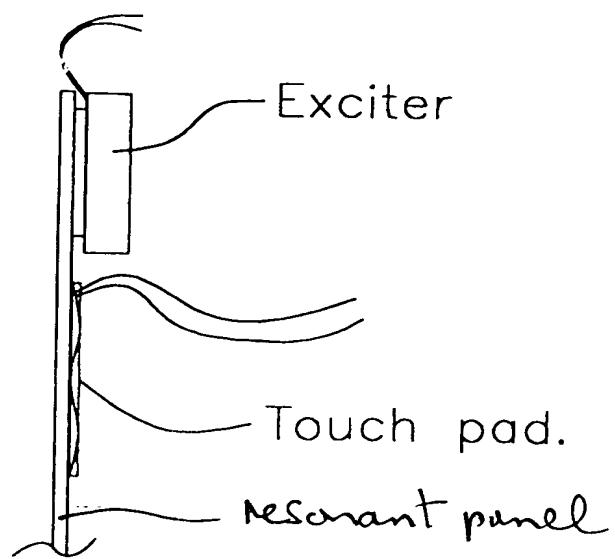
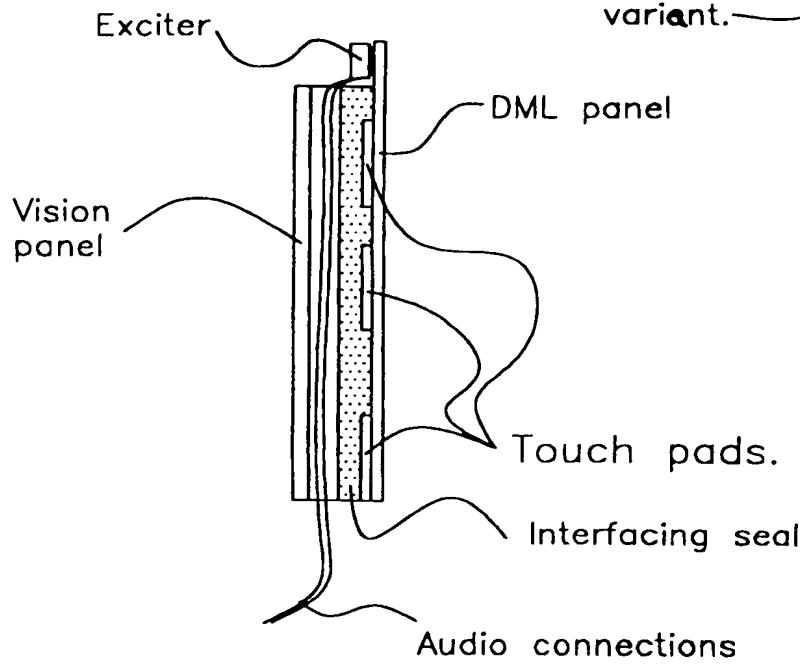


Fig 6a



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Peizo electric
variant.

Fig 6b

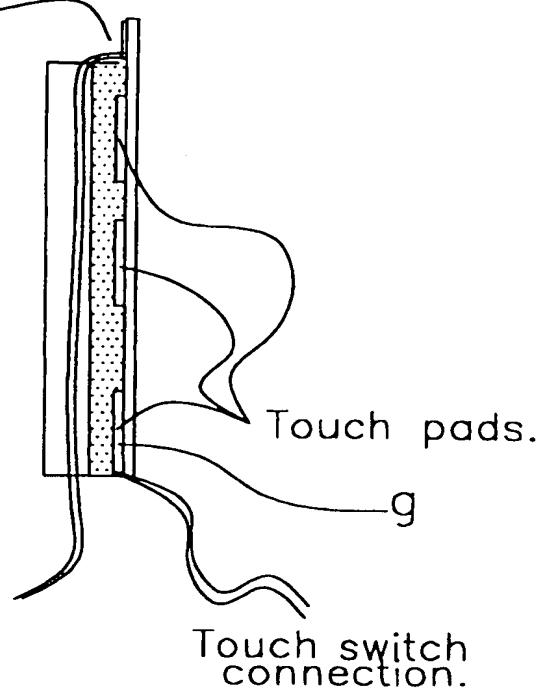


Fig 7

